



**JS Army Corps  
of Engineers**

North Central Division

# Great Lakes Levels Update No. 30 Annual Summary, 1987 January 1, 1988

Like the proverbial March that comes in like a lion and goes out like a lamb, the past year has seen a complete turnabout in lake level conditions. Due to a carryover of high supplies from 1986, two monthly records were broken in January 1987, one on Lakes Michigan-Huron and the other on Lake Erie. Throughout the remainder of the year, lake levels have been dropping and approaching their long-term averages, with Lake Superior and Lake Ontario actually dropping below their averages during the year (Lake Ontario since June and Lake Superior since July).

## Conditions on the Lakes

After five consecutive months of above average precipitation on the Great Lakes basin in 1986, the trend was finally reversed, beginning in November 1986 and carrying into 1987, with eight consecutive months of record low precipitation for that length of time. During that period, November 1986 through June 1987, precipitation on the Great Lakes basin was 25 percent below normal; then, this summer, some of the lakes had record or near record evaporation rates. Consequently, the critical high levels on the lakes quickly diminished as they began to descend towards their long-term averages. Due to this dry period on the basin, only slight rises in the lake levels occurred during the spring and summer of 1987, normally a period when the lakes rise by one to one and one-half feet to their seasonal highs. Lakes Michigan-Huron, for example, averaged 580.25 feet in April and were no higher than that in June. Thereafter, they began their seasonal decline. The level of Lake Superior dropped below its long-term average in July, rose slightly above average in August, then continued to decline through the rest of the year. Although precipitation during the July through November 1987 period was about 15 percent above average, it did not hinder the seasonal decline of the lakes, as they continued to parallel their long-term averages during the latter part of the year. Figure 1 shows the precipitation on the Great Lakes basin from 1985 through 1987.

Through the end of December 1987, Lake Superior was about 4 inches below average and Lake Ontario was at its average level. While Lakes Michigan-Huron, St. Clair and Erie were above their long-term averages, they were well below the record highs of one year ago.

Mild temperatures at the end of the navigation season allowed all ocean vessels to exit the Great

Lakes-St. Lawrence Seaway system unhindered by ice formation. A stable ice cover on the outflow rivers is important in preventing ice jams and maintaining a good flow of water throughout the winter; at the close of the year, this has not occurred yet.

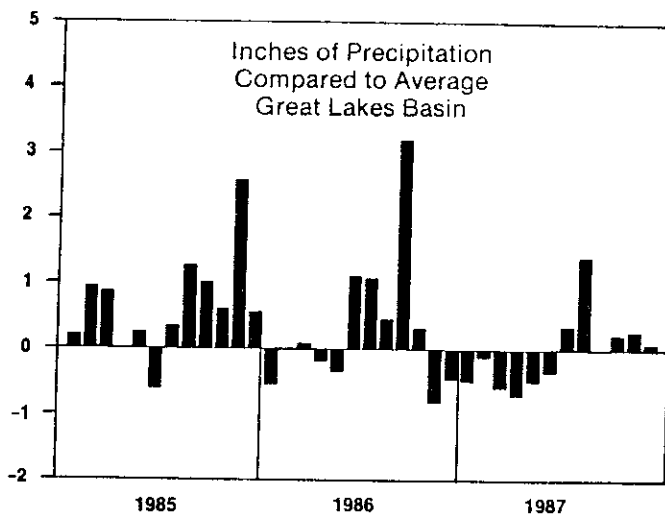


Figure 1

## Storms

We were fortunate that relatively few storms occurred in 1987 while some of the lake levels were still high. A February 8th storm over Lake Michigan, with storm waves combined with the already high water level, caused extensive damage along the southern Michigan, Indiana, Illinois and Wisconsin shores, especially on the Milwaukee and Chicago lakefronts. Damages were also reported in Milwaukee and Kenosha Counties, Wisconsin and Leelanau and Manistee Counties, Michigan. Normally there would have been some ice cover on the lakes in February so that a storm at that time would do little damage.

As the result of the weak lake ice cover, strong north winds on February 14th and 15th forced broken ice from Lake Huron to enter the St. Clair River and jam in the lower river. U.S. Coast Guard ice breakers were called on to remove or reduce the partial blockage and lower the water levels. The ice jam flooding caused the evacuation of some homes in the vicinity of Algonac, Michigan.

On December 14th and 15th, a winter storm dropped up to 12 inches of snow in some areas of eastern Wisconsin and Michigan. Gale-force winds caused flooding and erosion at various locations. The storm initially caused the water level of Lake Erie at Toledo to rise about 3.5 feet early on December 15th, and then, due to shifting winds, the water level dropped over 10 feet by the end of the day; conversely, the water level at Buffalo initially dropped slightly and then rose about 9 feet (see Figure 2). It is estimated that the Corps' Advance Measures projects on western Lake Erie and Saginaw Bay (see below) prevented nearly \$8 million in damages from this storm.

### Lake Regulation

Throughout 1987, the International Joint Commission (IJC) continued to direct outflows from Lake Superior and Lake Ontario through its control boards. Lake Superior outflows were those specified by regulation Plan 1977 for the entire year.

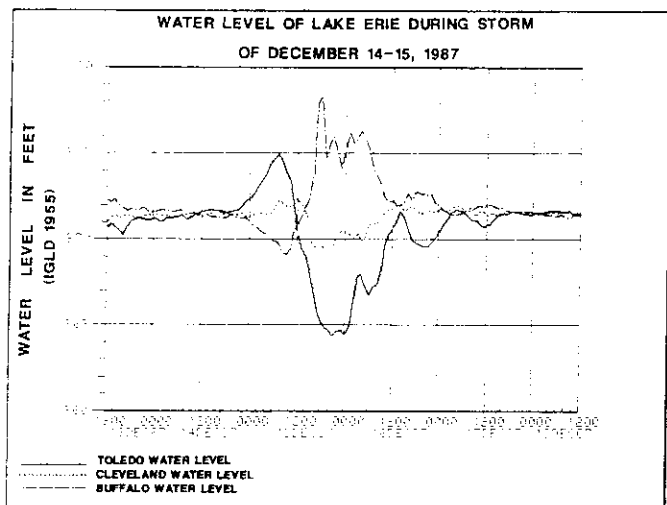


Figure 2

Forecasts made in the fall of 1986, based on the then-current high inflows from Lake Erie and record high runoff from the Lake Ontario basin, indicated that new record high levels would be set on Lake Ontario during 1987. In light of this, Lake Ontario outflows continued high under Criterion (k), which is an emergency action specified in the IJC's Orders of Approval. As a result of this action, along with an unexpectedly dry winter and spring, the expected record highs on Lake Ontario did not occur; the peak level occurred unusually early in April as the levels responded to diminished supplies. By June, the lake level had dropped to its long-term average. Lower Lake Ontario levels combined with high discharge rates began causing low water levels along the St. Lawrence River and problems for shore property owners, boaters and marina operators. Therefore, with the continuing decline in lake levels, the IJC

directed the International St. Lawrence River Board of Control to abandon high flows and return to Plan 1958-D (the current regulation plan for Lake Ontario) by the end of July. The reduction in outflow, as a result of returning to the Plan, slowed the seasonal decline in levels on Lake Ontario and eased the low water situation on the St. Lawrence River. The 1987 minimum daily level occurred in December which was five inches below the long-term average (1900-1986) for the month.

### Lake Level Reference

On August 1, 1986, the Governments of Canada and the United States issued a new Reference to the IJC for a comprehensive, multi-year study of methods to alleviate the adverse consequences of fluctuating Great Lakes water levels, in terms of both the immediate high levels crisis and the long-term impacts. The new Reference represents a far-reaching study that will involve using new ideas and methods of analysis beyond those of previous studies. The approach to the Reference is two-fold. The first involves quick answers at relatively low cost and effort. The second concentrates on longer-term controls which could assist full basin management. The IJC consulted with various experts in Canada and the United States to identify the most productive approach to the Reference's broad questions. The short-term, or interim study was concluded in the early fall of 1987 and was presented to the IJC. This information report was publicly released at an IJC workshop held in Toledo, Ohio, on November 17th, 1987. The results of this study will assist the IJC during future crises and will be input into the long-term study. The magnitude and complexity of the long-term study, as proposed, required that it be addressed in two phases. Phase I, with a report in May 1989, will provide a comprehensive framework for the systemic evaluation of measures, a preliminary assessment of the main types of measures, and an outline for the initiatives of Phase II. Phase II, with the final report in September 1991, will apply the evaluation procedures in detail to specific selected measures identified in Phase I.

### Advance Measures

Activities under the Corps' Advance Measures Program are nearing an end. This program, authorized under Public Law 84-99, is to provide flood protection to urban property, public facilities and certain adjacent lands prior to flooding from an immediate and severe flood threat. Note that this authority is not applicable to erosion problems.

Advance Measures is a temporary program and remains in effect only as long as the flood threat exists or until state and local authorities have sufficient time to adequately cope with the situation. As a result of the receding water levels, the current program for the Advance Measures is expected to conclude in the spring of 1988.

The Advance Measures Construction Program has provided several emergency flood protection projects in Michigan, Ohio and Illinois. In Michigan, projects are in place at Luna Pier, Estral Beach, Frenchtown Township, Erie Township and two locations in Brownstown Township; all located on Lake Erie. Construction is still underway on the Hampton Township Advance Measures projects located on Saginaw Bay in Bay County, Michigan. In Ohio, projects at East Lake and Bayview on Lake Erie are complete. Construction of Wightmans Grove, also on Lake Erie has just begun. In Illinois, a project in the Edgewater area of Chicago is nearly complete. No other construction projects are being considered at this time.

The Advance Measures Self-Help Program for furnishing sand, sandbags and plastic sheeting to the counties of Great Lakes shoreline communities and residents affected by flooding continues, though requests for these materials have been minimal in recent months. Materials will continue to be available

at least through next spring. An up-to-date summary of distribution is as follows:

**Buffalo District:**

Sandbags ..... 1,113,000  
 Sand (tons) ..... 18,200  
 Plastic Sheeting Rolls ..... 420

**Chicago District:**

Sandbags ..... 240,000  
 Sand (tons) ..... 1,428  
 Plastic Sheeting Rolls ..... 40

**Detroit District:**

Sandbags ..... 3,750,340  
 Sand (tons) ..... 23,802  
 Plastic Sheeting Rolls ..... 1,800

**Totals:**

Sandbags ..... 5,103,340  
 Sand (tons) ..... 43,430  
 Plastic Sheeting rolls ..... 2,260

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**Corps Assistance**

The Corps is also authorized to assist local communities in responding to actual flooding situations, by supplementing maximum state and local efforts. Requests for assistance should be directed through local and state disaster assistance agencies. For Great Lakes basin technical assistance or information, please contact one of the following Corps of Engineers District Offices:

*For New York, Penn. & Ohio:*

**Colonel Daniel R. Clark**  
 Cdr, Buffalo District  
 1776 Niagara Street  
 Buffalo, NY 14207-3199  
 (716) 876-5454, Ext. 2201

*For Mich., Minn. & Wisc.:*

**Colonel Robert F. Harris**  
 Cdr, Detroit District  
 P.O. Box 1027  
 Detroit, Michigan 48231-1027  
 (313) 226-6440

*For Illinois & Indiana:*

**Lt. Col. Jess J. Franco Jr.**  
 Cdr, Chicago District  
 219 South Dearborn Street  
 6th Floor  
 Chicago, Illinois 60604-1779  
 (312) 353-6400


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The "Help Yourself" brochure is still available from the District offices listed above or from this office: North Central Division, 536 South Clark Street, Chicago, Illinois 60605-1592, telephone: (312) 353-6364.

**Future**

Presently, there is reason for optimism for the users of the Great Lakes system, especially if conditions on the basin continue as they have throughout the past year. With below average precipitation and high evaporation occurring on the basin during 1987, the levels of the lakes have dropped considerably. Whether or not this trend will continue, nobody can know. Because of this unpredictability, I continue to emphasize the importance of protecting your shore property from potential damage.

I will issue monthly updates to accompany the Levels Bulletin in the coming year until conditions on the lakes no longer warrant their publication. That situation is my New Year's wish for all of you.



**Theodore Vander Els**  
 Brigadier General, USA  
 Commanding



*Flooding along Lakeshore Drive, Chicago, Illinois  
February 8, 1987*